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Control and Elimination of Noxious Weeds

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CONTROL AND ELIMINATION OF

noxious weeds



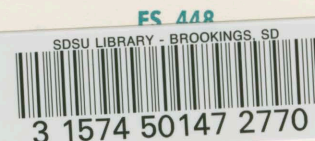
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F.S. 448 third rev.

Control and Elimination of Noxious Weeds

by Lyle A. Derscheid, Extension Agronomist, and
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All of South Dakota's noxious weeds are perennials. They spread by underground parts and by seed. Field bindweed (creeping jenny) infests $1\frac{1}{3}$ million acres on 30,000 farms; Canada thistle, 300,000 acres on 23,000 farms; perennial sowthistle, 304,000 acres on 13,000 farms; leafy spurge, 78,000 acres on 5,700 farms; hoary cress, 3,400 acres on 370 farms; Russian knapweed, 1,500 acres on 290 farms; horse nettle, 550 acres on 160 farms; and quackgrass, 175,000 acres on 13,000 farms.

Intensive studies have been conducted over a period of 10 years each for leafy spurge and field bindweed; eight years for Russian knapweed; and six years each for Canada thistle and perennial sowthistle to determine methods of controlling and eliminating these weeds. All of them can be eliminated while raising crops adapted to South Dakota. Detailed suggestions for the control of these weeds are given in separate publications.

Less time has been spent studying quackgrass, hoary cress, and horse nettle. Consequently, most of the suggestions offered in this publication are based on results obtained in neighboring states. Detailed suggestions for the control of quackgrass are given in a separate publication.

Use of cultivation, competitive crops, and spraying is suggested in numerous combinations. Cultivation should be performed with a field cultivator equipped with wide sweeps (12 to 60 inches) that are kept sharp and operated at a depth of 4 inches. For June spraying, spray small grain when in the 5-leaf stage of growth and spray corn between first and second cultivations. Always use an ester of 2, 4-D on leafy spurge, Russian knapweed, or hoary cress. Use an ester on field bindweed and thistles when growing conditions are hot and dry, but use an amine of 2, 4-D under good growing conditions. MCPA is as effective as 2, 4-D on thistles. Use nonvolatile formulations of 2, 4-D when spraying in shelterbelts or near gardens.

Consult the herbicide label for uses and restrictions that may be imposed on the herbicides listed herein.

CROPS, CULTIVATION AND CHEMICALS

Treatment rates of chemicals are in pounds acid equivalent or active ingredient per acre. Several methods of obtaining the results indicated in each subheading are listed. For example, there are five ways of reducing field bindweed stands 75 to 90%.

FIELD BINDWEED

Reduce stands 75 to 90%

- 1) Intensive cultivation at two-week intervals June-July and three-week intervals August-October.
- 2) Small grain, $\frac{3}{4}$ lb. 2, 4-D June, cultivate stubble three or four times.

- 3) Cultivate three times, sudangrass in late June, harvest and cultivate in September.
- 4) Intensive cultivation June 1 to August 15, alfalfa and/or perennial grass.
- 5) Intensive cultivation June 1 to August 1, $\frac{3}{4}$ lb. of 2, 4-D September 1.

Reduce stands 10 to 25%

- 1) Small grain, $\frac{3}{4}$ lb. 2, 4-D in June, $\frac{3}{4}$ lb. 2, 4-D in stubble.
- 2) Corn or sorghum, $\frac{3}{4}$ lb. 2, 4-D after first cultivation, $\frac{3}{4}$ lb. after tasseling or heading.
- 3) Perennial grass, $\frac{3}{4}$ lb. 2, 4-D in early June, $\frac{3}{4}$ lb. in August or September.
- 4) Good stand of alfalfa or alfalfa-grass mixture.
- 5) In shelterbelt, amitrole-T—6 lb. in 40 to 50 gallons of water. Direct spray away from trees. Do not harvest food or feed from treated areas.

Prevent spreading

- 1) Small grain, $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D in June.
- 2) Corn or sorghum, $\frac{3}{4}$ lb. 2, 4-D in June.
- 3) Perennial sod forming grass.

Prevent reinfestation

- 1) Small grain or corn, $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D in June.
- 2) Alfalfa or perennial grass crop.

CANADA THISTLE AND PERENNIAL SOWTHISTLE

Reduce stands 75 to 90%

- 1) Intensive cultivation, three-week intervals June-July and four-week intervals August-September.
- 2) Small grain, $\frac{3}{4}$ lb. 2, 4-D June, cultivate stubble three or four times.
- 3) Small grain, $\frac{3}{4}$ lb. 2, 4-D June, plow stubble early, $\frac{3}{4}$ lb. 2, 4-D September.
- 4) Small grain, $\frac{3}{4}$ lb. 2, 4-D June, plow October 15.
- 5) In shelterbelt, amitrole-T—6 lb. in 40 to 50 gallons of water. Direct spray away from trees. Do not harvest food or feed from treated areas.
- 6) Cultivate three times, sudangrass late June, harvest and cultivate September.
- 7) Intensive cultivation June 1 to August 15, alfalfa and/or perennial grass.
- 8) Corn, 2 lb. atrazine plus 1 gal. crop oil after thistles emerge but before they are 6 in. high. Repeat with drop nozzle equipment 10-20 days later but before layby.

Reduce stands 10 to 50%

- 1) Small grain, $\frac{3}{4}$ lb. 2, 4-D June, $\frac{3}{4}$ lb. in stubble.
- 2) Corn or sorghum, $\frac{3}{4}$ lb. 2, 4-D after first cultivation, $\frac{3}{4}$ lb. after tasseling or heading.
- 3) Perennial grass, $\frac{3}{4}$ lb. 2, 4-D early June, $\frac{3}{4}$ lb. August or September.
- 4) Good stand of alfalfa or alfalfa-grass mixture.

Prevent spreading by roots

- 1) Small grain, $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D in June.
- 2) Corn or sorghum, $\frac{3}{4}$ lb. 2, 4-D in June.
- 3) Perennial sod forming grass.

Prevent seed production

- 1) Mow before flowers have been open seven days.
- 2) Spray with $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D in June.

Prevent reinfestation

- 1) Small grain or corn, $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D in June.
- 2) Alfalfa or perennial grass crop.

LEAFY SPURGE

Reduce stands 75 to 90%

- 1) Intensive cultivation at two-week intervals May-July and three-week intervals August-October.
- 2) Cultivate three times, sudangrass late June, harvest and cultivate in September.
- 3) Intensive cultivation May 15 to August 15, alfalfa and/or perennial grass.
- 4) Heavy grazing with sheep.

Reduce stands 10 to 20%

- 1) Small grain, 1 lb. 2, 4-D ester in June, cultivate stubble four times.
- 2) Perennial grass, $1\frac{1}{2}$ lb. 2, 4-D ester mid-May, $1\frac{1}{2}$ lb. late August.
- 3) In shelterbelts, amitrole-T—6 lb. in 40 to 50 gallons of water. Direct spray away from trees. Do not harvest food or feed from treated areas.

Prevent spreading

- 1) Small grain, $\frac{1}{2}$ lb. 2, 4-D ester in June, 1 lb. 2, 4-D ester in stubble.
- 2) Corn or sorghum, $\frac{1}{2}$ lb. 2, 4-D ester after first cultivation, 1 lb. after tasseling or heading.
- 3) Good stand of alfalfa or alfalfa-grass mixture.
- 4) Perennial grass, 1 lb. 2, 4-D ester in May.

Prevent reinfestation

- 1) Small grain or corn, $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D ester in June.
- 2) Alfalfa or sweet clover crop.

RUSSIAN KNAWEED

Reduce stands 75 to 90%

- 1) Intensive cultivation at two-week intervals May-July and three-week intervals August-October.
- 2) One and one-half lb. 2, 4-D ester August, cultivate three times in spring, sudangrass late June, harvest and cultivate in September.
- 3) Intensive cultivation mid-May to mid-August, alfalfa and/or perennial grass.

Reduce stands 10 to 30%

- 1) Cultivate three times, sudangrass late June, harvest and cultivate in September.
- 2) Small grain, 1 lb. 2, 4-D ester in June, $1\frac{1}{2}$ lb. in stubble.
- 3) Perennial grass, 1 lb. 2, 4-D ester late May, $1\frac{1}{2}$ lb. late August.

Prevent spreading

- 1) Small grain, $\frac{1}{2}$ lb. 2, 4-D ester, cultivate stubble three or four times.
- 2) Perennial grass, $1\frac{1}{2}$ lb. 2, 4-D ester in June.

Prevent reinfestation

- 1) Small grain, $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D ester June.
- 2) Corn, $\frac{1}{3}$ to $\frac{1}{2}$ lb. 2, 4-D ester after first cultivation.

QUACKGRASS

Reduce stands 90%

- 1) Four lbs. atrazine in September or October or early April, plow in late fall or in May (at least three weeks after application), plant corn, and cultivate.
- 2) Two lbs. atrazine between September 15 and May 1. Plow in late fall or May (at least three weeks after application), plant corn, apply 2 lbs. atrazine within two weeks after planting corn, cultivate.
- 3) Eight lb. atrazine on noncropland.
- 4) Intensive cultivation with duckfoot or one-way disk every three weeks during dry year.
- 5) Six lb. dalapon when quack is 4 to 6 inches tall, plow 10 days later, cultivate. Certain crops listed on the label can be planted in four to six weeks.
- 6) Mow in August, 10 lb. dalapon when regrowth 4 to 8 inches tall, plow 10 days later. Crops listed on the label can be planted.
- 7) In established shelterbelts, use 4 lb. simazine and 2 lb. amitrole-T in at least 50 gallons of water. Do not harvest food or feed from treated areas.

HOARY CRESS

Reduce stands 75 to 90%

- 1) Perennial grass, 2 lb. 2, 4-D early May, 2 lb. September.
- 2) Ten lbs. 2, 4-D amine early spring or after October 15. (Non-cropland only)

Reduce stands 10 to 20%

- 1) Small grain, $\frac{1}{2}$ to 1 lb. 2, 4-D ester late May or early June, cultivate stubble three times.

Prevent reinfestation

- 1) Crop, $\frac{1}{2}$ lb. 2, 4-D ester.
- 2) Good crop of perennial grass.

HORSE NETTLE

Reduce stands

- 1) Two lbs 2,4,5-T ester before weed starts to bud.

BUR RAGWEED

Reduce stands 75 to 90%

- 1) Two lbs. 2, 4-D ester in oil during June.

CALIBRATION OF EQUIPMENT

(Field and Band Sprayers and Granule Band Applicators — see fact sheet entitled “Checking Weed Sprayers”).

FERTILIZER OR CART TYPE SPREADER

(For Treating Small Patches)

1. Divide the number of square feet in a square rod (273) by width of spreader swath.
Example: If the spreader swath is 3 feet wide, divide 273 by 3. The answer is 91. This is the number of feet the spreader will have to travel in order to cover a square rod.
2. Measure the circumference of the wheel with a string. Suppose the circumference is 5 feet.
3. Determine the number of revolutions the wheel will make in order to cover a square rod. Divide the distance that spreader must travel (91 feet in No. 1) by the circumference of the wheel (5 feet in No. 2), $91 \div 5 = 18.2$. The wheel must turn 18 1/5 times in order to cover a square rod.
4. Fill spreader with chemical, put container under spreader to catch chemical, jack up wheels and turn wheels the number of times required to cover a

square rod (18 1/5 times in No. 3). Weigh the chemical that was discharged by spreader. If necessary, adjust spreader, turn wheel and weigh chemical. Repeat this process until the desired amount of chemical is discharged.

CHESTBROADCAST SPREADER

(For Treating Small Patches)

1. Same as for fertilizer spreader. Divide 273 by width of swath. Suppose the swath is 6 feet. $273 \div 6 = 45\frac{1}{2}$.
2. Weigh amount of chemical put into hopper.
3. Walk 45 1/2 feet while cranking spreader.
4. Weigh amount of chemical left in the hopper. The difference between this weight and the weight of the amount put in hopper (No. 2) is the amount spread.
5. Adjust spreader and repeat steps 2, 3 and 4 until the desired amount of chemical has been spread.

HAND SPRAYER

(For Treating Small Patches)

1. Mark out a square rod plot (16 1/2 feet by 16 1/2 feet) and spray with hand sprayer at a slow walking speed, so good saturation and penetration will be accomplished.
2. If 1 gallon is used to treat this square rod, then mix enough chemical for 1 square rod with each gallon of water and always spray at same walking speed. A slow steady pace is suggested.

SMALL PATCH CONTROL

SEMI-SELECTIVE HERBICIDES IN PASTURE AND RANGE

The following treatments are intended to give 90 to 100% elimination of the weeds listed in grass pastures and range. The treatments are most useful for small infestations. Refer to the table listing the amount of product required for one square rod. Control seedlings and stragglers emerging in following season with an annual 2,4-D application.

1. Dicamba at 8 lb./A acid equivalent to control Canada thistle, perennial sow thistle and field bindweed. Follow label restrictions for grazing or haying for dairy cattle.
2. Picloram at 1 1/2 lb./A acid equivalent for Canada thistle, perennial sow thistle, field bindweed and Russian knapweed or 2 lb./A acid equivalent for leafy spurge. These rates are usually satisfactory; however, in a few situations, some leafy spurge regrowth has been noted the following season. Follow application directions, precautions and limitations on the label.

Safety First

Read and follow all label directions and precautions. Federal regulations and label directions concerning the uses of chemicals are subject to change.

SEMI-SELECTIVE HERBICIDES IN NON-CROPLAND

Numerous chemicals are effective for eliminating patches (weed nurseries) with one treatment applied to the patch and a band 6 or 8 feet wide around the outside of the patch. It kills plants in the patch and roots that extend beyond the patch. Seedling growth may appear after two or three years. These young plants can be eliminated with 2, 4-D application. Many new semiselective chemicals do not permanently injure perennial grasses, but will prevent crop growth for two or more years.

The chemicals listed in the following table generally give 95 to 100% elimination when applied at the rates designated. Rates are given in pounds, pints, or fluid ounces of commercial product for each square rod. Use the higher rates for summer application for those chemicals indicating a range of treatment rate.

EPA regulations concerning the use of these herbicides on cropland, pasture or range change from time to time. Therefore, it is necessary to read the label on the chemical container or consult the local county agent to determine if the chemical is cleared for use on cropland or grazing land.

AMOUNT OF PRODUCT FOR TREATING ONE SQUARE ROD

Chemical	Field Bindweed	Thistle	Leafy Spurge	Russian Knapweed	Hoary Cress	Horse Nettle	Bur Ragweed	Cost in Dollars*
AMS (1).....	—	4-6 lbs.	4-6 lbs.	5-7 lbs.	—	—	—	\$2.16-3.78
2,3,6-TBA (2).....	3/8 pt.	3/8 pt.	1/2 pt.	1/2 pt.†	1/2 pt.	1/2 pt.	1/2 pt.	0.39-0.52
Fenac (3).....	1/2 pt.	1/2 pt.	1/2 pt.†	1/2 pt.	—	—	—	0.59-0.66
Dicamba (4).....	1.6 fl. oz.	1.6 fl. oz.	2 fl. oz.	2 fl. oz.	—	—	—	0.40-0.50
Picloram-2,4-D mixture (5).....	1.2 fl. oz.†	1.2 fl. oz.†	1.6 fl. oz.	1.2 fl. oz.	—	—	1.2 fl. oz.	0.31-0.41
Borate-Picloram mixture (6).....	3/4 lb.	3/4 lb.	1 lb.	3/4 lb.	—	—	3/4 lb.	0.67-0.90
Picloram (7).....	.6 fl. oz.	.6 fl. oz.	.8 fl. oz.	.6 fl. oz.	—	—	—	0.25-0.33

*Approximate retail cost of chemical for 1 square rod. (1 fl. oz.=6 tsp)

†Generally the most effective treatment for this weed.

(1) Brand Name "AMMATE X." Use 2 quarts of spreader-sticker/100 gal. spray solution. (Approved for use on non-cropland only.)

(2) Brand Name "TRYBEN 200." (Approved for use on non-cropland only.)

(3) Brand Name "FENAC." (Approved for use on non-cropland only.)

(4) Brand Name "BANVEL." Rates over 8 lb./A (1.6 fl. oz./sq. rd.) approved for use on non-cropland only.

(5) Brand Name "TORDON 212." (Approved for use on non-cropland only.)

(6) Brand Name "TORDON BEADS." (Approved for use on non-cropland only.)

(7) Brand Name "TORDON 22K." (Follow label restrictions and precautions when using in pasture and range.)

AMOUNTS OF PRODUCT NEEDED FOR SPRAYING PATCHES OF NOXIOUS WEEDS WITH A HAND SPRAYER

The foregoing table indicates how much chemical to use when applying chemicals to noxious weed patches. The following table may be helpful when applying 2,4-D, 2,4,5-T, amitrole or amitrole-T, atrazine, or other herbicides to small patches of noxious weeds with a hand sprayer.

Treatment rate per acre in lbs. acid equiv. or active ingredient	Product to treat 1 square rod if the product contains the following amounts of acid equivalent or active ingredient.*					
	Liquids				Powders	
	2 lbs. /gal.	3 lbs. /gal.	4 lbs. /gal.	6 lbs. /gal.	50% amitrole	80% atrazine or simazine
1/2	1 1/3 tsp.	1 tsp.	2/3 tsp.	1/2 tsp.	—	—
3/4	2 tsp.	1 1/3 tsp.	1 tsp.	3/4 tsp.	—	—
1	2 2/3 tsp.	1 3/4 tsp.	1 1/3 tsp.	7/8 tsp.	—	—
1 1/2	4 tsp.	2 2/3 tsp.	1 3/4 tsp.	1 1/3 tsp.	—	—
2	5 1/3 tsp.	3 1/2 tsp.	2 2/3 tsp.	1 3/4 tsp.	5 1/3 tbsp.	—
4	—	—	—	—	10 1/3 tbsp.	2 1/3 tbsp.
6	—	—	—	—	15 1/3 tbsp.	3 1/3 tbsp.
8	—	—	—	—	—	4 2/3 tbsp.
10	8 2/3 tbsp.	6 tbsp.	4 1/3 tbsp.	3 tbsp.	—	5 2/3 tbsp.

*tsp.—teaspoonsful

tbsp.—tablespoonsful

AREA TO TREAT AND AMOUNT OF CHEMICAL TO USE

Small patch treatments are based on rates of application by square rods. Not all patches of noxious weeds are perfect square rod plots. Also more area is treated than indicated by the patch because of roots extending out from the top growth area. The following table may help in figuring the area to treat and the amount of chemical to apply to that area. Granted all patches are not perfect circles in area but are usually more circular than rectangular. The following formula was used for determining the area of circular patches noted in the table:

$$\text{Area to be treated} = \frac{r^2 \pi}{\text{sq. ft./sq. rd.}} = \frac{r^2 \times 3.1416}{272.25}$$

Example: A patch is 30 feet in diameter. Area to be treated is 40 feet in diameter. Radius is one-half of diameter (20).

$$\frac{(20)^2 \times 3.1416}{272.25} = \frac{1256.64}{272.25} = 4.6 \text{ sq. rd.}$$

To obtain the area of rectangular patches, add 10 feet to both the width and length of the patch and multiply to get the area in square feet; then divide by 272.25 for the area in square rods.

The area of either a circular or rectangular patch can then be multiplied by the rate of product applied per square rod to obtain the amount of chemical needed for the patch treatment. This has been done for the various circular patches in the following table. Areas from rectangular patches could be fitted into this table.

Approx. diam. of nox. weed patch (ft.)	Approx. diam. of area to treat (ft.)	Sq. rds. in area to treat	AMOUNT OF PRODUCT TO APPLY THAT IS RECOMMENDED FOR ELIMINATION OF NOXIOUS WEEDS							
			AMS at 5 lbs./sq. rd.	TBA or Fenac at ½ pt./sq. rd.	TBA ⅔ pt./sq. rd.	Picloram-2,4-D at		Dicamba at 2 fl. oz./ sq. rd.	Borate-Picloram	
						1.2 fl. oz./ sq. rd.	1.6 fl. oz./ sq. rd.		¾ lb./sq. rd.	1 lb./sq. rd.
10	20	1.2	6 lbs.	10 fl. oz.	8 fl. oz.	1.5 fl. oz.	2 fl. oz.	2⅔ fl. oz.	1 lb.	1¼ lbs.
20	30	2.6	13 lbs.	21 fl. oz.	1 pt.	3.2 fl. oz.	4⅛ fl. oz.	5½ fl. oz.	2 lbs.	2⅔ lbs.
30	40	4.6	23 lbs.	2½ pt.	1¾ pt.	5.5 fl. oz.	7½ fl. oz.	9½ fl. oz.	3½ lbs.	4⅔ lbs.
40	50	7.2	36 lbs.	3¾ pt.	2¾ pt.	¾ pt.	11⅓ fl. oz.	14⅔ fl. oz.	5⅔ lbs.	7¼ lbs.
50	60	10.4	52 lbs.	5¼ pt.	3 pt.	¾ pt.	16⅔ fl. oz.	20¼ fl. oz.	7¼ lbs.	11 lbs.
60	70	14.2	71 lbs.	7 pt.	5⅓ pt.	1⅛ pt.	23 fl. oz.	28⅔ fl. oz.	10⅔ lbs.	14¾ lbs.
80	90	23.4	117 lbs.	11¾ pt.	8⅔ pt.	1¾ pt.	2⅔ pt.	2⅞ pt.	17½ lbs.	23½ lbs.
100	110	35.0	175 lbs.	8¾ qt.	6⅔ qt.	1⅓ qt.	3½ pt.	4⅜ pt.	26¼ lbs.	35 lbs.
120	130	49.0	245 lbs.	3 gal.	2½ gal.	1⅞ qt.	5 pt.	6⅛ pt.	36¾ lbs.	49 lbs.
140	150	65.2	326 lbs.	4 gal.	3 gal.	2½ qt.	6½ pt.	4 qt.	49 lbs.	65 lbs.
160	170	83.8	419 lbs.	5¼ gal.	4 gal.	3⅞ qt.	8⅔ pt.	5¼ qt.	63 lbs.	84 lbs.
180	190	104.6	523 lbs.	6½ gal.	5 gal.	1 gal.	5¼ qt.	6½ qt.	78½ lbs.	105 lbs.
200	210	127.8	639 lbs.	8 gal.	6 gal.	1 3/16 gal.	6⅔ qt.	8 qt.	96 lbs.	128 lbs.
220	230	153.2	766 lbs.	9⅔ gal.	7¼ gal.	1 6/16 gal.	7⅔ qt.	9⅔ qt.	115 lbs.	153 lbs.
240	250	181.2	906 lbs.	11½ gal.	8½ gal.	1 9/16 gal.	9 qt.	11⅓ qt.	136 lbs.	181 lbs.
Per Acre		160	800 lbs.	10 gal.	7½ gal.	1 ½ gal.	2 gal.	2½ gal.	120 lbs.	160 lbs.

Use of a trade name does not imply endorsement of one product over another.

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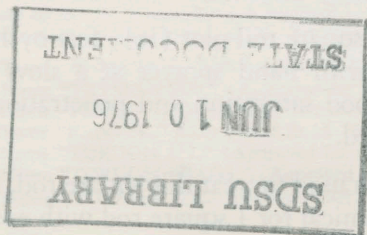
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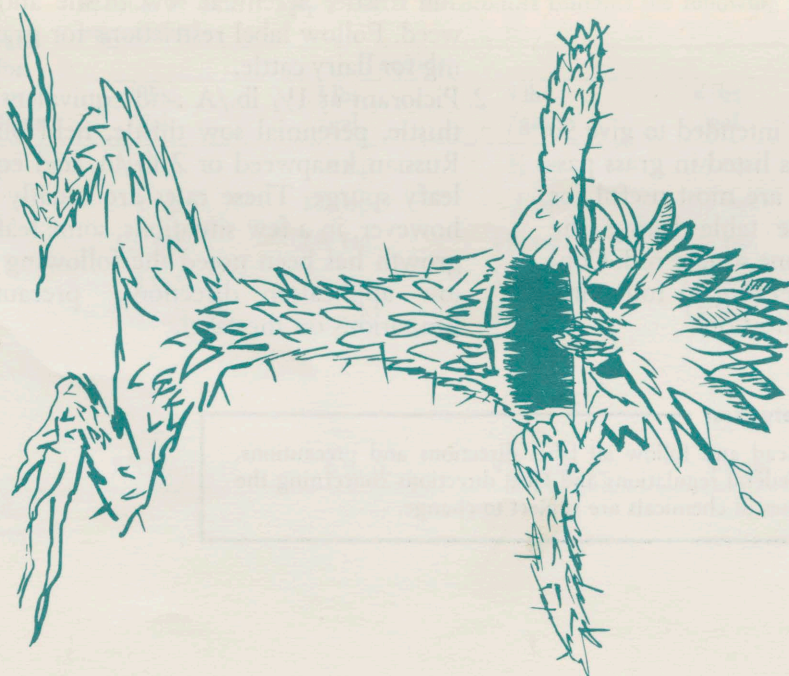
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